Claims

1. A method for designing a technical system,

- wherein the technical system comprises a predetermined set of target functions which are dependent on parameters;

- wherein each individual target function is weighted with a weighting factor;

- wherein an equation system comprising the parameters and the weighting factors as variables is solved in a variable space;

- wherein the solutions of the equation system form operating points of a solution space in the variable space;

- wherein the operating points are determined by means of a predictor-corrector method in which, starting from a first operating point, a predictor which is generated by means of a stochastic variable is determined in the variable space and subsequently, in a corrector step, a second operating point is determined;

- wherein the operating points are used for designing the technical system.

2. The method as claimed in one of the preceding claims, wherein the predictor is determined by means of random numbers.

3. The method as claimed in one of the preceding claims, wherein the random numbers are normally distributed.

4. The method as claimed in one of the preceding claims, wherein the stochastic variable is a stochastic process Z_t which satisfies the following equation:

$$dZ_t = \varepsilon P(Z_t) dB_t$$

where

$P(z)$ is a projection matrix onto the tangential space of the solution space in the valid operating point z,

ε is a scaling factor, and

$B_t, t \in \Re_0^+$ is a Brown movement in the variable space.

5. The method as claimed in one of the preceding claims, wherein pareto-optimal points are determined as the operating points.

6. The method as claimed in one of the preceding claims, wherein the operating points are the points with positive weighting factors in the solution space.

7. The method as claimed in one of the preceding claims, wherein the operating points satisfy one or more auxiliary conditions, with the or each auxiliary condition being represented by a further variable of the equation system in the variable space.

8. The method as claimed in claim 7, wherein the auxiliary conditions are equality auxiliary conditions and/or inequality auxiliary conditions.

9. The method as claimed in claim 8, wherein inequality auxiliary conditions are transformed into equality auxiliary conditions by means of a slack variable.

10. The method as claimed in one of the preceding claims, wherein the solution space is a manifold, in particular a submanifold in the variable space.

11. The method as claimed in one of the preceding claims, wherein the first operating point is determined by means of a weighting method.

12. The method as claimed in one of the preceding claims, wherein in the first operating point a tangential plane to the solution space is determined and the predictor is specified in said tangential plane.

13. The method as claimed in one of the preceding claims, wherein if a negative predictor with one or more negative weighting factors occurs, a new predictor is determined by means of a reflection at a subplane of the solution space of the operating points.

14. The method as claimed in claim 13, wherein

- a point of intersection of the trajectory which runs between the first operating point and the negative predictor with the subplane of the solution space is determined;

- the tangential component of the vector spanned by the point of intersection and the negative predictor is determined at a subplane of the solution space, with those weighting factors which were negative for the

negative predictor in the points of the subplane now being equal to zero;

- the normal component, associated with the tangential component, of the vector spanned by the point of intersection and the negative predictor is determined;

- the new predictor is determined by two times subtraction of the normal component from the negative predictor.

15. The method as claimed in one of the preceding claims, wherein the corrector method is a Newton method.

16. The method as claimed in one of the preceding claims, wherein die operating points are determined by means of iterations of the predictor-corrector method, with the second operating point of the preceding iteration step being used in a current iteration step as the first operating point of the predictor-corrector method.

17. The method as claimed in claim 16, wherein the method is terminated by an abort condition.

18. The method as claimed in claim 17, wherein the abort condition is satisfied when a predetermined number of operating points has been determined and/or a predetermined time limit has been reached.

19. An arrangement for designing a technical system for performing a method as claimed in one of the preceding claims, having a processor unit which is set up such that

- the technical system comprises a predeterminable set of target functions which are dependent on parameters;

- each individual target function is weighted with a weighting factor;

- an equation system comprising the parameters and the weighting factors as variables in a variable space can be solved;

- the solutions of the equation system form operating points of a solution space in the variable space;

- the operating points can be determined by means of a predictor-corrector method in which, starting from a first operating point, a predictor which is generated by means of a stochastic variable is determined in the variable space and subsequently, in a corrector step, a second operating point is determined;

- the operating points can be used for designing the technical system.

20. An arrangement as claimed in claim 19, comprising a random number generator for generating the stochastic variable.

21. A computer program product which has a storage medium on which is stored a computer program which is executable on a computer and by means of which the method as claimed in one of the claims 1 to 18 can be performed.